PB-219 600

EXHAUST EMISSIONS FROM A PASSENGER CAR POWERED BY MARVEL-SCHEBLER LPG CONVERSION

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National Air Pollution Control Administration
Ann Arbor, Michigan

September 1970

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15. Supplementary Notes

16. Abstracts

The exhaust emission characteristics of a 1969 Ford LTD equipped with a Marvel-Schebler LPG conversion were desired to supplement information on gaseous fuel vehicles. The car was equipped with a 429 cubic inch displacement engine, automatic transmission, and a decel device which held the throttle partially open on deceleration. The following tests were conducted: (1) standard 1968 Federal test procedure for exhaust emissions (FTP); (2) a closed, constant volume sampling technique using 9 repeats of the Federal emissions test cycle (CVS); (3) two closed, constant volume sampling technique using the LA4-S3 driving schedule as specified for 1972 and later testing. Bag samples were analyzed for carbon monoxide, carbon dioxide, hydrocarbons, and nitrogen oxides. It was concluded that the Marvel-Schebler car demonstrated the attainment of 1972 Federal standards and that the decel-device attached decreases hydrocarbon levels.

17. Key Words and Document Analysis. 17a. Descriptors

Air pollution
Automobiles
Exhaust emissions
Tests
Sampling
Air pollution control equipment
Carbon monoxide
Carbon dioxide
Hydrocarbons
Nitrogen oxides

17b. Identifiers/Open-Ended Terms

Marvel-Schebler LPG Conversion Device
Decel-device
1968 Federal Test Procedure (FTP)
Constant Volume Sampling (CVS)
LA4-S3 Driving Schedule
LPG Conversion Device

17c. COSATI Field/Group 13B

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Vehicle Tested

The exhaust emission characteristics of a 1969 Ford LTD equipped with a Marvel-Schebler LPG conversion were desired to supplement this agency's information on gaseous fuel vehicles. The car was equipped with a 429 cubic inch displacement engine and automatic transmission. In addition to the equipment necessary for LPG operation the car had a decel-device which held the throttle partially open on deceleration.

Tests Conducted

Because the car was only available for three days, tests were limited to the following types:

1. Standard 1968 Federal test procedure for exhaust emissions (FTP).

2. A closed, constant volume sampling technique using 9 repeats of the Federal emissions test cycle (CVS).

3. Two closed, constant volume sampling technique using the LA4-S3 driving schedule as specified for 1972 and later testing. One test was performed with the decel-device, one without.

Closed cycle data were taken using a constant volume sampling technique. Bag samples were analyzed using non-dispersive infrared analysis for carbon monoxide and carbon dioxide with hydrocarbons measured using a flame ionization detector. The Whittaker "NOx Box" was used for determination of oxides of nitrogen in the CVS sample.

Emission Results

Table I shows the test results and indicates the comparison between the decel-device configuration and no device. As is shown by the CVS results the car in both configurations meets or surpasses the 1972 Federal emission standards of 2.9 grams per mile (gpm) hydrocarbon, 37.0 gpm carbon monoxide, 3.0 gpm oxides of nitrogen. With the decel-device removed hydrocarbons increased about twenty percent.

Conclusions

1. The Marvel-Schebler car demonstrated the attainment of 1972 Federal standards.

2. The decel-device attached decreases hydrocarbon levels.

Table I

Marvel-Schebler 429 CID LPG Ford

1968 FTP	HC ppm	CO %	NO ppm
With decel device	48.1	.11	404.5
9 Cycle CVS	**HC gpm**	**CO gpm**	**NO gpm**
With decel device	.91	4.41	3.00
1972 FTP			
With decel device	1.04	3.77	1.95
Without decel device	1.29	3.99	1.94

Table I

1963 Ford Galaxie

1970 Federal Test Procedure	HC GPM	CO GPM	NO GPM
Without device	4.01	53.85	1.62
With Wilford Smog Suppressor	6.87	50.16	1.83